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THE OHIO STATE UNIVERSITY
W. O. Thompson, *President*

COLLEGE OF EDUCATION
George F. Arps, *Dean*

Ohio State University

College of Arts and Sciences

Summer Quarter

TEACHERS expecting to attend a summer session for self-improvement should not overlook the unusual opportunities afforded by the Ohio State University. The College of Education and the College of Arts and Sciences are intimately related and place their entire resources at the service of teachers during the Summer Quarter. The program for the summer offers a wide variety of both elementary and advanced courses in anatomy, bacteriology, botany, chemistry, economics, English, fine arts, French, geology, geography, German, history, home economics, journalism, Latin, mathematics, mechanics, philosophy, physics, psychology, public speaking, political science, Spanish, sociology, and zoology.

The College of Arts and Sciences regards the Summer Quarter in the same light as any other quarter and provides a staff of teachers chosen almost entirely from the regular faculty of the college. As a consequence the work of the Summer Quarter is just as ably conducted as that of any other Quarter, and all credits are honored by the University.

A teacher who wishes to devote the major part of his time to these content courses while lacking a limited amount of work in Education, should register in the College of Arts and Sciences; while those who expect to give most of their time to educational courses while lacking some one content course should register in the College of Education.

Teachers who are interested in having their work count toward a degree will do well to keep in mind the combination curriculum whereby the degree of B. Sc. in Education and the degree of A. B. can be secured by one quarter of residence beyond the requirement for the former degree. To take advantage of this arrangement requires care in selecting a program; and the advice of the Secretary of either of the colleges should be sought.

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Educational Research Bulletin

Pupils' Errors in Solving Arithmetic Problems[1]

R. L. Morton
Ohio University

The editor of this publication has pointed out that we know little about how to teach children to solve arithmetic problems. He says:

> Teaching arithmetic by problems is not common practice in the schools. Teachers in training hear little regarding the importance of the problem, the course in principles of education knows little of it. General methods is silent concerning it, and special methods in arithmetic scarcely recognize it.[2]

We are disposed to agree with the editor. The last decade seems to have witnessed material progress in only one respect, namely, as a consequence of the criticisms of the artificial character of problems published in textbooks, they are, today, more real and, perhaps, more interesting to children. Thorndike[3] suggests three classes of problems according to the kinds of situations which they represent: (1) those present to sense; (2) those imagined by the pupil; and (3) those described in words by another. He would supply as many of the first as possible, make skillful use of the second, and, if possible, eliminate the last entirely.

It is likely that some advance has also been made in recent years in the form of expressing solutions. Formerly, pupils were compelled to adhere rigidly to set forms of statement. Consider, for example, the problem:

> If two-thirds of the cost of a house is $4,000, what is the cost of the house?

How many remember how the details of our language were checked up as we solved this problem in the following words?

> Two-thirds of the cost of the house equals $4,000. One-third of the cost of the house equals one-half of $4,000, equals $2,000. Three-thirds of the cost of the house equals three times $2,000, or $6,000.

Woe unto the pupil who said, "$6,000, because $4,000 is two-thirds of $6,000." Or to the gifted youngster who reasoned thus: "When I know the cost of a number, and want to know the cost of one, I divide; so, $4,000 ÷ ⅔ = $6,000." In the words of Thorndike, "Concerning the technique of solving problems and expressing solutions, the newer methods advocate extreme catholicity."[4] Of course, the newer methods would not countenance the house problem, for it belongs to that large class which occurs only in textbooks and in which one must know the answer to frame the problem.

It would seem that an important step toward the improvement of the teaching of problem solving would be an analysis of the present situation in an

(1) This is the first of a series of three articles presenting an analysis of the papers of a group of pupils who were given a test in problems. The next will appear in an early issue.

(2) "On Teaching Problems," *Educational Research Bulletin*, 4:98, March 4, 1925.

(3) Thorndike, E. L. *The New Methods in Arithmetic*. Chicago, Rand McNally and Company, 1921. p. 126.

(4) *Ibid.*, p. 138.

effort to determine precisely the nature of the mistakes children make and the frequency with which these mistakes occur.

The following problem test was recently given to the pupils of grades V, VI, VII, and VIII, at Circleville, Ohio:

1. There are 6 eggs in the ice chest. Mother used 2 for making cookies. How many eggs were left?
2. Yesterday Frank earned 12 cents and today he earned 7 cents. How much did he earn in both days?
3. If one boy has ten fingers, how many fingers have 6 boys?
4. In a game of hide-and-seek 14 children hid, 7 were caught. How many were not caught?
5. We learn 2 words a day in our class. How many do we learn in 8 days?
6. How much will 6 footballs cost at $2.00 each?
7. How much did it cost Sarah to go to the picnic if she spent 20 cents for car fares, 6 cents for lemonade, 13 cents for candy, and 15 cents on the merry-go-round?
8. It was 2 o'clock in the afternoon when Little Boy Blue fell asleep under the hay stack. It was 5 o'clock when he woke up. How many hours did he sleep?
9. If you can get 3 ginger-bread dogs for 5 cents, how many can you get for 10 cents?
10. A boy owned three kites each of them having 150 feet of string. How many feet of string had he?
11. A car runs 11 miles on a gallon of gasoline. How many miles will it run on 6 gallons?
12. Helen has been promised a doll carriage costing $2.50, if she earns one-half the money. How much money must she earn?
13. Mary sold 2 yards of lace to one customer and 1¾ yards to another. How many yards did she sell in all?
12. A warship traveled 176 miles in 8 hours. How many miles did it travel in one hour?
15. A train due to reach the station at 15 minutes past 4 is half an hour late. At what time does it reach the station?
16. An automobile is run 135 miles with 9 gallons of gasoline. What distance will one gallon run it?
17. If a girl had two one-dollar bills, three five-cent pieces, two dimes, and three quarters, how much money did she have?
18. Evelyn made an apron in a sewing class. She bought 2 yards of gingham at 15 cents a yard, a card of braid for 5 cents, and a spool of thread for 5 cents. She sold the apron for 60 cents. How much did she gain?
19. A family burns 6 tons of hard coal at $8.25 a ton and 2 tons of soft coal at $5.75 a ton. What is the total cost of the coal?
20. The grocer bought apples at $2.00 a barrel. The freight charges and the expenses of selling the apples were 75 cents a barrel. He sold the apples at $3.25 a barrel. What was his profit on each barrel?
21. If the retailer pays $2.75 per box of 120 oranges and sells the oranges at 35 cents a dozen, what does he make on a box?
22. How many weeks will it take Joseph to save 21 dollars for a bicycle if he saves 1½ dollars a week?
23. If .78 of the weight of potatoes is water, how many pounds of water are there in a bushel of potatoes? A bushel of potatoes weighs 60 pounds.
24. Books were marked at $1 each. Later the price was reduced 30 percent. Find the cost of 5 books at the reduced price.
25. I borrowed $2,000 on January 15 and paid on July 15. If the rate is 6 percent, how much interest did I pay?
26. Mr. Lewis owns a piece of land 125 feet by 750 feet. How many city lots 25 feet by 125 feet will it make?
27. Two girls receive $2.10 for making buttonholes. One makes 42; the other, 28. How shall they divide the money?
28. Two boys made a gallon of lemonade, using 16 lemons at 30 cents a dozen and 2 pounds of sugar at 6 cents a pound. They sold it at 5 cents a glass, 6 glasses to a quart. How much was each boy's share of the gain?
29. The North Side Stars played 20 baseball games, winning 13 and losing 7. What percent of the 20 games did they win?
30. The VII-A class has 42 on roll and only 3 absent today; and the VII-B class has 48 on roll with 4 absent. Which has the better percent of attendance and how much?
31. The reading of my gas meter on February 1 showed 197,300 cubic feet. The reading on March 1 showed 205,700 cubic feet. If the rate is $1.05 per thousand, find the amount of my gas bill.
32. A farmer raised 1,325 bushels of corn on one field of 25 acres, and 958½ bushels on another field of 18¼ acres. What was the difference in yield per acre?

Fourteen classes were tested. Of these, four were fifth-grade classes, four were sixth-grade classes, three were seventh-grade classes, and three were eighth-grade classes. The seventh- and eighth-grade classes were ability groups, A, B, and C, classified on the combined bases of tests and teachers' judgments. In each grade the A-group is the best group and the C-group, the poorest. For this study, the papers of one class in each grade were used. In the seventh

and eighth grades, the papers of the B-groups were taken as the most probable representation of seventh- and eighth-grade abilities. A total of 117 papers were examined, including 35 from the fifth grade, 23 from the sixth grade, 35 from the seventh grade, and 24 from the eighth grade.

A summary of the errors made on each of the 32 problems of the test is given in Table I. This table shows for each problem the number of pupils in each grade, and in the four grades as a group, who attempted a solution, the number whose solutions were correct, and the number whose work was incorrect. Thus, the tenth problem was attempted by 35 pupils in the fifth grade, 23 in the sixth, 35 in the seventh, and 24 in the eighth, or the entire 117 pupils whose papers were examined. One hundred nine of the 117 pupils solved this problem correctly and eight, incorrectly. Of the eight who solved it incorrectly, seven were in the fifth grade and one was in the sixth grade.

It will be seen that the problems which occur near the beginning of the test are quite easy, while those near the end are difficult. The problems had presumably been arranged in the order of their difficulty as determined by

Table I. The Number of Pupils Trying Each of the Problems of the Test, the Number Solving Each Correctly, and the Number Solving Each Incorrectly

Problem Number	Grade V N = 35			Grade VI N = 23			Grade VII N = 35			Grade VIII N = 24			Total N = 117		
	T	R	W	T	R	W	T	R	W	T	R	W	T	R	W
1.....	35	35	0	23	23	0	35	35	0	24	24	0	117	117	0
2.....	35	31	4	23	21	2	35	34	1	24	24	0	117	110	7
3.....	35	35	0	23	23	0	35	35	0	24	24	0	117	117	0
4.....	35	34	1	23	22	1	35	35	0	24	23	1	117	114	3
5.....	35	33	2	23	23	0	35	35	0	24	24	0	117	115	2
6.....	35	34	1	23	22	1	35	35	0	24	24	0	117	115	2
7.....	35	31	4	23	23	0	35	35	0	24	24	0	117	113	4
8.....	35	30	5	23	21	2	34	34	0	24	23	1	116	108	8
9.....	35	20	15	22	18	4	35	33	2	24	23	1	116	94	22
10.....	35	28	7	23	22	1	35	35	0	24	24	0	117	109	8
11.....	35	33	2	23	22	1	35	35	0	24	24	0	117	114	3
12.....	35	31	4	23	19	4	35	34	1	24	24	0	117	108	9
13.....	35	23	12	23	17	6	35	33	2	24	22	2	117	95	22
14.....	33	18	15	21	16	5	35	34	1	24	23	1	113	91	22
15.....	32	19	13	19	12	7	35	34	1	24	24	0	110	89	21
16.....	34	21	13	21	19	2	35	34	1	24	24	0	114	98	16
17.....	34	21	13	22	18	4	35	32	3	24	21	3	115	92	23
18.....	34	15	19	23	16	7	35	33	2	24	23	1	116	87	29
19.....	35	15	20	23	17	6	35	33	2	24	23	1	117	88	29
20.....	31	10	21	23	11	12	35	26	9	24	22	2	113	69	44
21.....	34	8	26	21	8	13	35	24	11	24	20	4	114	60	54
22.....	27	5	22	23	8	15	34	32	2	24	23	1	108	68	40
23.....	25	3	22	21	4	17	33	22	11	22	20	2	101	49	52
24.....	27	5	22	21	5	16	34	24	10	23	20	3	105	54	51
25.....	21	0	21	16	1	15	34	23	11	24	7	17	95	31	64
26.....	28	0	28	20	2	18	35	18	17	24	16	8	107	36	71
27.....	30	3	27	21	2	19	31	17	14	21	12	9	103	34	69
28.....	26	0	26	21	2	19	34	19	15	23	10	13	104	31	73
29.....	28	0	28	18	0	18	31	17	14	21	14	7	98	31	67
30.....	28	0	28	20	0	20	33	0	33	19	6	13	100	6	94
31.....	22	0	22	14	1	13	32	0	32	23	4	19	91	5	86
32.....	21	0	21	14	0	14	31	3	28	17	4	13	83	7	76
Total.....	1,005	541	464	680	418	262	1,096	873	223	745	623	122	3,526	2,455	1,071

Note.—*T* means number trying a problem, *R* means the number getting it right, and *W*, the number getting it wrong.

previous testing. That this is approximately true can be seen by examining the entries in the last column of Table I. The ninth problem, however, seems to be more difficult than was thought.

Teachers of arithmetic will find it interesting to study the data of Table I

TABLE II. THE NUMBER OF PAPERS CONTAINING NO WRONG SOLUTIONS AND THE NUMBER CONTAINING ONE WRONG SOLUTION, TWO WRONG SOLUTIONS, ETC.

Number of Wrong Solutions	Frequency	Number of Wrong Solutions	Frequency
0	1	14	6
1	1	15	3
2	1	16	1
3	11	17	5
4	8	18	2
5	10	19	0
6	12	20	2
7	10	21	1
8	7	22	3
9	9	23	1
10	8	Total	117
11	6	Median	8.6
12	5	Mean	9.2
13	4		

with particular problems of the test in mind. For example, problem number 18, relative to Evelyn's gain on the apron which she made in the sewing class, was incorrectly solved by 19 of the 34 fifth-grade pupils who tried it, by 7 of the 23 sixth-grade pupils, by 2 of the 35 seventh-grade pupils, and by 1 of the 24 eighth-grade pupils. Facts such as these, accompanied by a detailed determination of the nature of the error in each case, constitute the foundation for effective remedial instruction.

A grand total of 1,071 problems was attempted but incorrectly solved. Of these, 464 were in the fifth grade, 262 were in the sixth grade, 223 were in the seventh, and 122 were in the eighth. A pupil was considered to have attempted a problem if his paper showed enough work to indicate that he had actually performed some operation. But if he had merely copied certain numbers, the problem was scored as omitted.

The number of wrong solutions found in the papers of the individual pupils ranged from zero to 23. The median is 8.6; the mean is 9.2. Table II is a frequency distribution showing the number of pupils having no wrong solutions, the number having one wrong solution, the number having two wrong solutions, etc.

The data of Table II indicate what tests usually show, namely, that large differences exist among these pupils. Not only do they differ as to the number of wrong solutions which their papers contained and as to the particular problems which they were unable to solve, but—and this is more important—as to the kinds of errors which they made, as well. It will be agreed that an important task for the teacher is that of helping pupils to correct their mistakes. This becomes largely a matter of dealing with the pupils as individuals. A classification of the errors of the pupils will be presented in our next article.

Dramatizing Problems

ELSA J. FUGE
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The teacher who aspires successfully to teach problem-solving encounters many difficulties. The paramount obstacle seems to be that of getting children to identify the problems with life situations, for some, at least, recount difficulties similar to those which the pupils encounter every day. To the majority of children a problem means a troublesome question which must be answered as soon as possible, and they are chiefly concerned with the numbers

given. The condensed story told by the problem holds little or no meaning for them.

In the attempt to overcome this inability of the child to identify the story in the problem, I have used dramatization. Not all problems lend themselves easily to such treatment, but many seemingly impossible problems can be acted out by the pupils who have had some experience in dramatizing stories. The ingenious methods which children will adopt to make a little play out of a seemingly unattractive problem are sometimes remarkable. My work has been done entirely in the fourth grade and the children at this age are still quite imaginative. Five problems of varying difficulty are generally chosen for this purpose. The class is given several minutes in which to read over the problems and to decide how each may be played. Each problem is then taken up and the number of characters needed to dramatize it is determined. Some pupil is called upon to tell how he would play the story. If his version is worth while, he is chosen with the other necessary actors to play out the story. These children then retire to the dressing-room or hall and quietly discuss their plans.

Since some problems require four or five characters and others only two or three, about half the class is generally engaged in working out the short plays. They may use any of the furniture or equipment about the room which is necessary for their stage settings. The preparations are very simple and the consultations among the groups who are to present the five problems do not generally take over four or five minutes. The pupils not included in the casts of the various playlets think about the problems so that they may be a critical audience, because if the rendering of a story is unsatisfactory, another group will be chosen which will attempt to give it more effectively. When a problem is acted out the answer obtained is practically always correct. Even the children most limited in reasoning ability assist intelligently in playing problem stories. Children enjoy this type of work and the task of dramatizing problems is attacked with pleasure and intelligent enthusiasm.

The problems presented in this paper have been played by the pupils in a fourth-grade room and all the conversations quoted are in the actual words used by the boys and girls in their dramatizations. The pupils naturally prefer problems which require child actors and which deal with their own difficulties. The following simple problems were easily dramatized:

Mary is 10 years old, Jane is 12 years old, and Frank is 13. How old is George if he is 3 years older than Jane?

Mary: I am 10 years old. How old are you, Jane?
Jane: I am 12 years old. How old are you, Frank?
Frank: I am 13 years old. How old are you, George?
George: I am 3 years older than Jane.
Mary: Then you are 15, because Jane is 12, and 12 and 3 are 15.

Two boys were counting their marbles. Tony found that he had 20 and that this was 10 less than Bert had. How many do they both have?

Bert: Hello, Tony. Let's count our marbles.
Tony: All right.
B: How many have you?
T: (After counting), I have 20.
B: Hot Dog! I have 30. I'm ahead of you.
T: I have 10 less than you have.
B: How many does that make together?
T: Twenty and 30 are 50. Say, let's put them together.
B: No, that wouldn't be fair, for I have more than you have.

A girl went to a store with 96 cents. She spent 24 cents for butter and the rest for sugar at 6 cents a pound. How much sugar did she buy?

Clerk: Good morning. What can I do for you?
Girl: I want 24 cents worth of butter.
C: Is there anything else?
G: I have 96 cents. What is left I want to spend for sugar.
C: Since 24 from 96 is 72, you have 72 cents left.

G: How much does sugar cost a pound?
C: Six cents.
G: Well, then I'll take 12 pounds because 6 goes into 72, 12 times.

Charles weighs 60 pounds, Mary 50 pounds, and George 70 pounds. What do the two boys weigh?

In a dramatization of this problem the three actors took turns weighing themselves and then the boys climbed on the scales together to find the answer of the question asked.

George sold his wagon to Frank for one-half of what it cost him. How much did the wagon cost Frank if George paid $4.50 for it?

In pretending this situation Frank bargained with George to buy his wagon. George said the wagon was just as good as new and had only been used three months. Frank decided to pay half the original price, because he thought $2.25 was not too much.

Problems which involve grown-up characters and their arithmetical difficulties may also be dramatized:

Mr. Jones' yard is 200 foot by 100 foot. What length of fence is required to go around it?

In the dramatization of the problem Mr. Jones lamented the fact that the neighbors' chickens were ruining his garden and asked his son to help him measure it as he had decided to fence it in. They decided that 600 feet of wire fencing was sufficient.

Mr. Adams' house cost $4,370 and Mr. Boyd's cost $3,745. Find the difference in the cost of the two houses.

Mr. Adams and Mr. Boyd discussed the cost of their houses and Mr. Boyd estimated that Mr. Adams' house cost $625 more than his.

One hundred and thirty-five dollars was divided equally among 5 boys. How much did each boy receive?

The cast of characters for this problem included a lawyer and five boys. The boys were informed that their deceased uncle had left $135 which was to be divided equally among them. The boys after dividing the sum by 5 decided that each boy was to receive $27.

How many years have passed since the Boston Tea Party in 1773?

In dramatizing this problem the cast of characters consisted of two persons who were much interested in this historical event, because one of them had just learned that his great-great-grandfather was one of the men who participated in the famous party. By subtracting 1773 from 1925, they decided it occurred 152 years ago.

Interesting problems suitable for dramatization may be constructed, using the seasonal activities of the pupils. These may include arithmetic situations found in football, baseball, basketball, circus, picnics, parties, and holiday festivals. Two such problems are:

Mary's father took her and her friend, Alice, to a football game. Mary's father's ticket cost 75 cents and the tickets for the girls cost 50 cents apiece. What did all the tickets cost?

There are 25 boys in our room. How many football teams can be formed from that number? How many boys will then be left for substitutes?

Girls as well as boys like such problems as these and are able to take their parts without difficulty. The pupils sometimes compose problems for themselves. Several cautions must be kept in mind when using these problems, however. Do not devote too much time to this type of drill or it will lose its value. Do not make elaborate preparations. State the problem in simple, clear-cut sentences which can be easily understood and remembered by each child. Be careful to keep the actors to the text of the problem.

This device will aid the pupils in understanding the meaning of arithmetic problems and will serve as an aid in assisting them to identify themselves with the characters in the problem as they now identify themselves with the characters in a story which they are reading. If not used too frequently it will act as a stimulus to interest.

Community Insurance of School Buildings

Ward G. Reeder
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Fire is a wanton demon exacting a huge toll annually from the people of the United States. According to the National Society for the Prevention of Waste, the annual fire loss for the nation exceeds $500,000,000. This figure, though huge—for it amounts to $5 for each man, woman, and child—is really too small, because it represents merely the destruction wrought. It does not take into consideration the resultant business loss occasioned by inability to continue business during the time required for replacement; nor does it take into account the loss due to death caused by fire—a loss which cannot be adequately measured by dollars and cents.

No class of property escapes the devastation of fire. School buildings are no exception to the rule. School-building fires are of frequent occurrence; indeed, it is reported that, on the average, one school building a day burns in the United States. The money loss to society due to school fires runs into the millions annually. Would that all, or much, of this waste could be saved, saved so that it might be applied to the remedying of some of the shortcomings of our system of education! It is generally agreed that much of the waste could be saved. It is not the purpose of this paper, however, to point out ways and means of preventing this waste; rather it is its purpose to discuss a relatively new idea in school-building insurance, namely, community insurance.

In common with holders of private property, most boards of education have deemed it advisable to carry fire insurance on their school buildings. The general practice has been for boards of education to insure their buildings with some insurance company. During recent years, however, many boards of education, particularly those of the larger cities, have used the plan that is usually called self-insurance or community insurance of school buildings. Cincinnati is an excellent example of a city that has such a plan in operation; since the plan has been in successful operation there for several years, it is believed that a brief description of it may be of interest to other communities.

In 1913, the Cincinnati Board of Education decided that thenceforth it would carry its own insurance on its school buildings. At that time, it voted to set aside annually $25,000 to be placed in a permanent fund that would be used to repair any damages caused by fire. This amount, it should be noted, was approximately the same as the schools were then paying the insurance companies annually. It was agreed that the fund could not be used for anything except for repairing fire damages; this policy has been strictly adhered to.

The fund has bountifully increased, due to the annual payments and the annual interest on the investment, until it now amounts to approximately $350,000. It should be noted here that the fire losses in Cincinnati have been very small, which fact largely accounts for the present size of the fund. A reason for Cincinnati's small losses is probably found in the fact that she has taken great pains to see that all fire hazards in and near the school buildings were either entirely eliminated or reduced to a minimum; moreover, she has made sure that ample and efficient fire-fighting apparatus and material were close at hand. It seems plausible to

assume that community insurance of school buildings tends to make a community more zealous in protecting its buildings than it would be, were the buildings insured with a commercial company.

The insurance fund, which, as has been said, now amounts to approximately $350,000, is invested in Cincinnati school bonds. The annual interest on the bonds goes into the insurance fund. At present, the interest on the fund amounts to approximately $20,000 annually, a sum almost as large as the $25,000 premium that has been paid annually since 1913.

The interest on the present fund has been deemed adequate by the board of education to take care of all likely losses by fire in the future. Hence, no provision has been made in the 1925 budget for the annual appropriation of $25,000. Thus, Cincinnati now has an endowment, which, if properly handled, and granted that the city is fairly fortunate in escaping large losses from fire, will insure her school buildings in perpetuity. And it is to be noted that she has created the endowment without any extra drain on her school budget; she has simply diverted to the fund what she would have paid to the insurance companies. It is evident that in the carrying out of the plan, Cincinnati has done some wise financiering; she has saved thousands of dollars.

In addition to the economy which results, the plan has the further merit, when insurance is carried with commercial companies, of eliminating the large amount of work made necessary, of computing valuations of buildings, of figuring rates, of looking after the payment of premiums, and of making renewals of policies. A still further thing in its favor is that it obviates the competition of the numerous insurance companies for the school business—a competition which frequently engenders jealousies and hatreds, often to the harm of the schools.

In introducing the plan, most cities have kept all or part of their commercial insurance until the replacement fund was of sufficient amount to care for any probable loss. After the fund was sufficiently large, the commercial insurance has been entirely dropped. In using the plan, if, at any time, an unusually large fire loss should occur, the city could go back to commercial insurance until the replacement fund has been built up again.

It is evident, though, that the plan would hardly be feasible in a small community, say, in a community with only one or two school buildings. The complete loss of the only building or of one of the few buildings in a small community might mean a staggering blow to the finances of the community. It appears that the plan is feasible only in fairly large cities and in counties that have all of the schools under one board of education; in many such communities the plan is now in successful operation and it is believed that the plan is worth a trial by other large communities.

In summary, it may be said that community insurance of school buildings, particularly in the larger communities, has three merits: (1) it is cheaper than commercial insurance; (2) it saves the time of boards of education and school administrators, in having to compute valuations, figure rates, pay premiums, and renew policies; and (3) it obviates the competition of the insurance companies for the school business.

PROBLEM ANALYSIS TEST

Mr. George Melcher, assistant superintendent of schools, Kansas City, Missouri, has been making an extensive study of the pupils' ability to solve arithmetic problems. One of the tests used was the Stevenson Arithmetic

Reading Test (Problem Analysis). In his report Mr. Melcher says:

> The main purpose of arithmetic is, of course, to enable one to solve the quantitative problems that arise in the home, in industry, in business, and in science. Consequently, however necessary it may be to habituate known facts and processes, it must not be forgotten that the work in arithmetic is to culminate the ability to solve the practical problems of life.

The ability to solve problems in arithmetic depends upon four important factors: (1) ability in silent reading, (2) experience with the content material of problems, (3) knowledge of certain technical arithmetical terms and also certain arithmetical principles, and (4) skill in the fundamental operations of arithmetic.

Table I. Scores on the Different Parts of the Stevenson Problem Analysis Test, Test II, Form I, May, 1924

	Number of Pupils	Total Medians
VII-A White	3,437	19.7
VII-A Colored	300	17.5
VII-A White and Colored	3,737	19.6
VII-B White	493	15.8
VII-B Colored	62	16.4
VII-B White and Colored	555	15.9
Total Seventh Grade	4,292	19.0
VI-A White	1,792	15.7
VI-B White	218	9.5
VI-A and VI-B White	2,010	15.0
VI-A Colored	126	14.3
V-A White	50	15.0

The Stevenson Problem Analysis test uses all of these factors except the fourth. In this test pupils are not required to do any of the mechanical operations. The Kansas City pupils did well in relation to standards on all the phases of the test except that of estimating answers. Only about 40 percent of the pupils could do better in estimating answers.

Detailed medians for the four parts of the test and for the total tests are given in Table I.

Table II. June, 1924, Norms for the Stevenson Problem Analysis Test

Grade	Form	
	1	2
IV-A	11	12
V-A	16	17
VI-A	17	18
VII-A	18	19
VIII-A	20	21
IX-A	22	22

Table II presents the medians obtained last June for the different grades in the Stevenson Problem Analysis Test. At least 600 cases were used in establishing the standards for each grade, while in several of the grades the number was larger.

Mr. Melcher concludes that the Kansas City norms are higher than the standards. There are many pupils in the lower quartile at least who need detailed instructions on how to solve arithmetic problems and that more attention should be given to estimating or judging (not guessing) the correct results to problems.

The teachers of Bedford are keeping up their professional training by reading educational magazines and books. They have a unique way of securing access to a large number of magazines without a great cost to the individual teacher. Every building has a list of magazines and each teacher subscribes for a certain number of them, seldom more than three. When they come, the teacher reads the magazines and returns them again to the magazine table of her building so that the other teachers may read them also. At the end of the year these magazines are bound and kept on file for the future.

Ohio State University

Educational Research Bulletin

Published fortnightly, except during June, July, and August, with but one issue in December, for the schools of Ohio by the Bureau of Educational Research, College of Education, The Ohio State University, Columbus.

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By this time our attitude on research *for* teachers and research *by* teachers is perhaps known to the readers of the *Bulletin*. Briefly we believe that teachers as far as they are able should do some work of a research character. We also believe that some notably useful work has already been done and that it ought to be made available for the use of teachers.

Research of use to teachers, however, has largely been confined to the elementary-school field. It seems to be hard to get things started in the secondary field. There are a number of reasons why this is true. A few of them are good reasons; most of them are not.

Be that as it may, we are pleased to be able to publish in this issue an article which although it is very slight in itself is highly suggestive. Miss Tyler has taken one of the items which every beginner's book in Latin contains and has ascertained the distribution of practice in respect to it. She has done this for half a dozen different textbooks. Naturally they show considerable difference both in the "attack" upon the item in question, the reference to it on subsequent pages, the precise point in the beginner's course at which it is introduced, and the intervals thereafter during which no practice occurs.

This should be done for all the important topics or items which belong to the introductory course in Latin. If the distribution of practice on the number facts in arithmetic is important—and it has been found to be highly important—there is no reason why the language facts of Latin or of any other foreign language should not be studied in the same way. For example, we might very well study the distribution of practice on a fundamental vocabulary in a foreign language. We hope that Miss Tyler's article will prove to be the first of a number of articles we shall be privileged to publish which will have for their object the closer study and more helpful analysis of the high-school subjects.

COOPERATIVE RESEARCH IN SECONDARY EDUCATION

Research, as a method of solving educational problems through the discovery of the fundamental facts, has been growing in importance for many years. Such research was begun in the psychological laboratories, but it soon became apparent that the solution of many problems of teaching or learning must be sought under schoolroom conditions. Inferences as to probable reactions of children have so often been proved wrong that the tendency to minimize the value of laboratory research has developed. The custom of carrying research directly into the schoolroom and studying the problem under normal schoolroom conditions has grown steadily.

Even here a limit was soon recognized. Since the research worker can never be sure to what extent a given class or school represents the normal schoolroom situation or the direction of possible variation therefrom, research on a small scale has often failed to supply adequate data. The recognition of this fact has led to extensive cooperative schemes of research. Educational officials and teachers in many schools have worked

simultaneously on a given problem under a common director in order to obtain results which would represent the central tendency.

The mass of such research has been carried on in elementary schools and usually has emanated from the research bureaus in universities, or from state departments of education. To a large measure these cooperative researches conducted from such centers have tended to work in restricted areas. Only when data could be easily gathered by questionnaire methods have the investigators attempted to include the whole country.

There are, however, many problems of great importance to education in the United States, the solution of which depends upon actual investigations throughout the nation. This means cooperation on a large scale. Its success will depend upon the enthusiastic nation-wide support of the school people and upon adequate direction.

Some five years ago the Department of Superintendence of the National Education Association, partly to safeguard its members against the too prevalent questionnaire, and also to unify research activity among its members, organized a Division of Research with headquarters in Washington.

Within the past year, a similar movement has been started in the field of secondary education. Workers in this field have appealed to the Bureau of Education to undertake the organization of the various secondary-school agencies for cooperative research. The Bureau of Education is to be used as a clearing-house. The matter of joining in this undertaking was proposed at a conference of representatives of the National Association of High-School Inspectors and Supervisors, the National Association of Secondary-School Principals, the National Society of College Teachers of Education, the Southern Association of College and Secondary Schools, the North Central Association of Colleges and Secondary Schools, the New England Association of Colleges and Secondary Schools, the Association of Colleges and Preparatory Schools of the Middle States and Maryland, the Northwest Association of Secondary and Higher Schools, and the California High-School Teachers Association. Each of these associations will appoint a representative to act as a member of the general national committee whose function it will be to initiate, direct, and coordinate research in secondary education. Some of the proposed activities of the Bureau of Education in setting up this service are:

> To assume the duties attached to the office of executive secretary of the committee; to serve as a repository of information in the way of raw data made available through specific studies on forms approved by the committee, theses of graduate students on secondary-education topics, and other special research studies made by any of the cooperating organizations independent of the general committee, such information to be distributed by the Bureau of Education in the way agreed upon as desirable by the general committee and the Commissioner of Education; to collect data for research studies authorized by the general committee, tabulate or assist in tabulating data on authorized studies, undertake through its own personnel to make studies recommended by the committee and approved by the Commissioner of Education; to publish such theses and special studies as are recommended by the committee and approved by the Commissioner of Education, and to prepare and distribute periodical lists of available data, theses, or special studies under way or completed by member institutions of cooperating organizations.

This direct quotation from an announcement of the project written by Mr. E. E. Windes, associate specialist in rural education, has been circulated by the Bureau of Education.

The Federal Bureau has carried on various types of research for many years. Immense quantities of data have been gathered from the school people of the country annually, but in this program there is the promise of a wider activity and a finer response than has ever been secured before. Secondary-school people are wanting to know the facts in regard to secondary education. They are

demanding a part in research. Thousands of them are adequately prepared to participate. Secondary education and, through it, other fields of education from the kindergarten to the graduate school should reap large benefits from the cooperative efforts of the school people under joint directorship of the workers themselves and our Federal Bureau.

E. J. A.

The Latin Infinitive of Indirect Statement in Beginning Textbooks

CAROLINE TYLER
Barrett Junior High School, Columbus

During the recent Classical League Investigation many pupils were given the Godsey and Pressey tests on the functional knowledge of Latin constructions. In the Godsey test the problem of the infinitive and indirect statement was expressed by the following:

He says peace is being made.
Dicit (pax, pacam, pacem, paci) fieri.

At the end of the second semester 20 percent of the pupils answered this correctly.

In the Pressey test the noun as subject of the infinitive was tested by:

I know the boy is there.
Puerum ibi esse scio. Puer ibi est scio.
Puerum ibi est scio. Puer ibi esse scio.

Forty-eight percent of the pupils answered this correctly.

Twenty and forty-eight become percents still more serious when we realize that the infinitive in indirect statement is the twelfth most frequent construction in high-school Latin texts. It occurs 1,174 times (Caesar, 568; Cicero, 441; and Vergil, 157), while the subject accusative ranks fourteenth with 1,147 occurrences (Caesar, 485; Cicero, 505; and Vergil, 157).[1]

These results show a startling inaccuracy of learning. They raise some pertinent questions relative to beginning textbooks in Latin. How much drill is offered in indirect statement? When is this drill introduced? Over how long a period is it extended? How frequent are the opportunities for practice? What is the ratio of the Latin-English to the English-Latin sentences? How are the various difficulties approached? Figures 1, 2, and 3 do not answer all of these questions, but they do show comparison of the amount and distribution of practice in beginning Latin given by seven well-known and recent textbooks. They also show the proportion of Latin to English drill sentences.

A first glance shows a marked variance in amount and we wonder whether texts III and VII are giving entirely too much drill or whether the other five authors are failing to give all that is necessary. Let us compare this problem with the estimates offered for psychological drill in arithmetic upon simple bonds:

> Assuming that by the end of grade VI a strength of 199 out of 200 is to be had and that the teaching is by an intelligent person working in accord with psychological principles as to both ability and interest . . . . for bonds of ordinary difficulty such as (4 times 2, 11 minus 3, 48 divided by 6 equal 8) with average facilitation from other bonds, in the case of the average or median pupil, we may estimate twenty practices in the first week of learning, supported by thirty during the two months following, and maintained by fifty practices well spread over the last period.[2]

Let us remember also that not only are the bonds in indirect statement in

(1) Byrne, Lee. *Syntax of High-School Latin*. Chicago, University of Chicago Press, 1918, p. 18.

(2) Thorndike, E. L. *Psychology of Arithmetic*. New York, Macmillan Company, 1922. p. 133.

Latin *not* simple bonds, but they most frequently operate under a changed mental set or adjustment, such as change in vocabulary, tense, and word order. In such cases we are told that the excess practice and over-learning

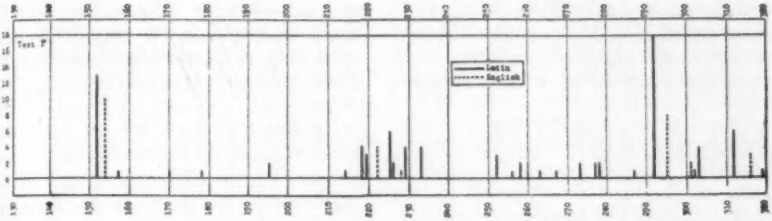

FIGURE 1. DISTRIBUTION OF PRACTICE ON USING THE INFINITIVE IN INDIRECT STATEMENT

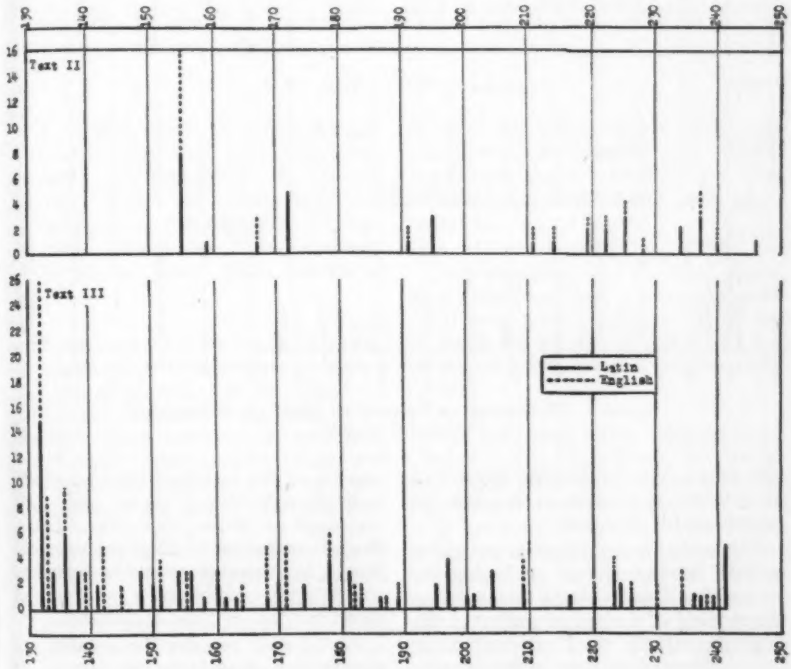

FIGURE 2. DISTRIBUTION OF PRACTICE ON USING THE INFINITIVE IN INDIRECT STATEMENT

are actually desirable.[1] It would certainly not seem that pupils studying the texts IV, V, or VI, would ever reach the over-learning stage.

Under these circumstances unless the teacher adds extra drill the average child does not thoroughly assimilate the construction and passes on to the new work mentally encumbered with a confused idea which both hinders the acquisition of the new and tends to increase and perpetuate his old errors.

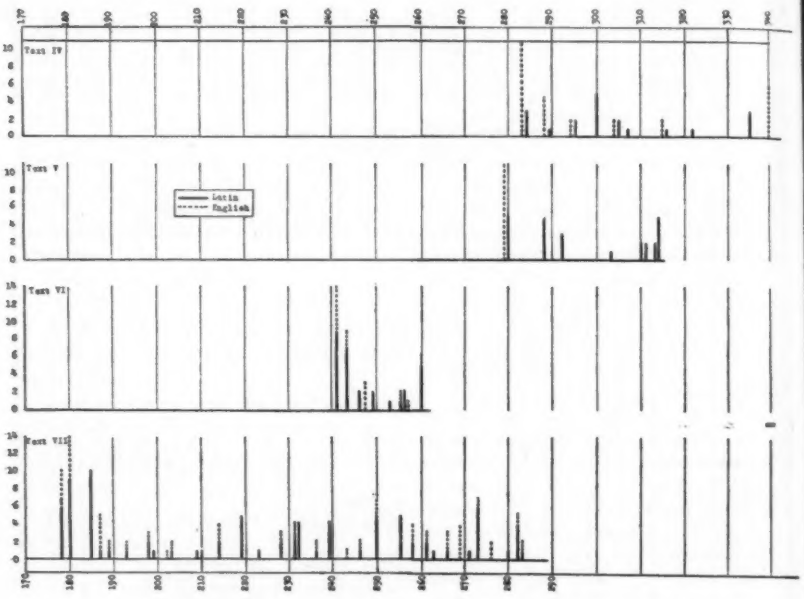

FIGURE 3. DISTRIBUTION OF PRACTICE ON USING THE INFINITIVE IN INDIRECT STATEMENT

Nor would it seem that we are aiming at the "199 out of 200" goal when we realize that "many pupils who take up the reading of a classical author at the beginning of the third semester do so with a thorough mastery of few or none of the principles of noun syntax, and with a knowledge of verb syntax that is almost negligible."[2]

In these diagrams the figures on the base line refer to each ten pages of text; those at the sides, to the number of practice exercises given; the broken lines, to English-Latin sentences; and solid lines, to Latin-English sentences. Space will not here permit any discussion of the various difficulties of the indirect statement in Latin and their treatment nor of the proportion of Latin-English sentences to English-Latin sentences, but this ratio should be examined in relation to our objectives and the most direct method of their attainment.

Let us now consider the amount and distribution of this practice material in

(1) Thorndike, E. L. *Psychology of Arithmetic*. New York, Macmillan Company, 1922. p. 134.

(2) American Classical League. Advisory Committee. *The Classical Investigation*. General Report. Princeton, Princeton University Press, 1924. Part I, p. 139.

these seven texts. Texts which introduce indirect statement on pages 240 or 280 will be handicapped from the start in giving proper length to the practice period.

In text VI the drill on infinitive in indirect statement is concluded in twenty pages. Is this a case where indirect statement bonds "are left to die of inactivity" or one in which the bonds have never been formed? The material provided by this book is probably no more than is required for initial learning.

In text V almost the same amount of material is stretched to cover many more pages breaking the practice with big intervals. In texts I, II, and V the intervals between practices are so far apart that the effect of the original drill is largely lost, making the second practice almost like new material. This occurs several times in text I.

Texts I and II fail to give enough attention to the indirect statement in the days immediately following its introduction. In fact text II gives a much better distribution in the latter part of the text. Text VII shows some of this neglect of early practice, although there is plenty of drill following.

The ideal curve would start high with a heavy introduction and strong reviews on the following days, sloping gradually to less frequent practice periods throughout the rest of the text. Neither texts III nor VII show this ideal early practice material, however, these two texts both by the amount and distribution of practice provide a safer and easier method of attaining a knowledge of infinitive in indirect statement.

On the Firing Line

A careful study of extra-curricular activity has been made by J. S. Masson, assistant superintendent of schools, Lorain, Ohio. This study has been reported in a mimeographed bulletin entitled "Notes on Extra-Curricular Activities in Junior High Schools of Lorain."

A mimeographed copy of the report on standardized tests has been published by the Cuyahoga County Board of Education, Bulletin No. 8, 1924. This bulletin, which was prepared by Assistant County Superintendent Baer, and County Superintendent Yawberg, gives the details of the work for the past year.

A report of the nation-wide survey of achievement in English composition through the Pressey Diagnostic Test in English Composition has recently been published by the Public School Publishing Company of Bloomington, Illinois. The survey was conducted in every state in the Union except in Nevada and District of Columbia; over 300,000 pupils participated. Medians have been obtained for both white and negro schools.

Superintendent H. V. Bear reports that intelligence and achievement tests have been given to practically all the pupils in the schools at Miamisburg and remedial instruction has followed the testing.

An interesting article appeared in the *Shaker Heights School Review* for January on "Educational Achievement as Shown by Tests." Some of the questions asked and answered were: (1) Are Shaker Heights pupils using their native ability? (2) Are they making the most of their intelligence? (3) How intelligent are the Shaker Heights pupils? The results show that the Shaker Heights pupils on the whole are unusually intelligent and under the direction of efficient teachers

are using this ability to attain unusual educational ends.

At the Cincinnati meeting, the National Association of Secondary Principals decided to make a comprehensive study of the relation of class-size to the efficiency of teaching. P. R. Stevenson of the Bureau of Educational Research has been asked to serve as one member of the committee to direct the study.

The Lima Board of Education has asked the Bureau of Educational Research to make a complete building survey and to propose a school-building program for the next ten years. Lima has been growing rapidly and the school population has increased to such an extent that additional classrooms and buildings are needed.

The survey will be under the direction of P. R. Stevenson, who will be assisted by members of the University staff and graduate students. Mr. R. E. Offenhauer, superintendent of schools, and Glen S. Long, director of research, are helping to plan the survey.

Canton is planning fourteen building projects to be completed within the next two years as follows: eight additions to present school buildings, five new buildings including a junior high school to accommodate 1,200 pupils, and an administration building. The cost of this building program will be $1,800,000. Superintendent Wilson Hawkins reports that the Canton school enrollment has increased 80 percent. In seven years the high-school enrollment has more than doubled. Assistant Superintendent Fred L. Teal is working with numerous committees of teachers and principals in endeavoring to develop courses of study for the elementary and special schools.

On Saturday evening, March 7, Mr. Angelo Patri, the well-known school principal from New York City, addressed a meeting of the Cleveland Teachers Federation. On Saturday evening, April 25, Dr. W. H. Kilpatrick, of Columbia University, will address the Federation. This lecture will close the series which have been presented by the Cleveland Teachers Federation during the school year. Dr. Kilpatrick's address will be preceded by a dinner in the ballroom at the Hotel Cleveland. The lecture and dinner are open to anyone in northeastern Ohio who cares to attend. The price of the ticket is $1.50.

Mr. E. W. Howey was successful in securing the extra 2½ mill levy for his schools at the November election. He also says:

> That for the first time Defiance has a well-organized Parent-Teacher Association in every ward including the high school. Sentiment is also being created for the support of supervised playgrounds for the summer months.

The teaching force of Bedford under the direction of Superintendent Moody, is working along several lines to improve school conditions. Emphasis is being placed upon pupil growth instead of covering a certain number of pages in the textbook. Modifications of the project or problem method is used to a large degree. For the past year, due to enforcement of the truant law, a 95 percent attendance has been maintained. Special emphasis is placed upon the physical condition of pupils. A school nurse, a school physician, and several clinics will be maintained. There are also full-time supervisors of physical training who visit each ward building once a week and organize the play of the children starting new games and inspiring the regular teachers to go on with the work.

The Bedford High-School library consists of several thousand volumes and the pupils are taught how to use it. Visual education is used in the social sciences.

Bedford has adopted the group scheme of teaching instrumental music and has several rooms in which each pupil can play the piano. There is an orchestra of fifty pieces and a high-school boys' band almost as large.

The matter of the teachers' professional growth is not neglected in Bedford. Salary increases are dependent to a large degree upon further professional preparation on the part of the teachers.

The Miamisburg public schools recognize the value of training teachers in service. Teachers are employed at stated salaries; if they attend summer schools, $5.00 per month is added. This pays a good part of the necessary expense for a six-weeks term. Many of the teachers are taking advantage of the Board's offer. Substitute teachers are employed to take the place of any teacher who cares to visit other schools and in many cases the report of the visiting teacher is given at the regular teachers' meeting. That the school sentiment in Miamisburg is excellent was indicated by a four to one vote on the three-mill levy last November.

Mr. Edgar G. Weller, principal of the Roosevelt Junior High School, Springfield, Ohio, has worked out an honor-club system which proves to be a boon to scholastic work. Membership to the club may be attained by pupils having an average of 90 percent or better in all promotion subjects. Since the introduction of the plan in 1922, Mr. Weller finds that the number of pupils averaging 90 percent or above has been increased from 5 percent to 22 percent of the enrollment, which is evidence that the plan has been decidedly successful. All the junior high schools in the city are now using similar plans to stimulate scholarship.

Mr. Weller is also making a study of the amount of time spent in study both at schools and at home by the junior high-school pupils. The pupils are being given a method of study which is helping them to make adequate preparation for their school work.

The last number of the *Vinton County School News* contained a note from each school in the county. A brief story of each school and a statement of enrollment and activities for the past school year were given. The brief quotation given below is a historical sketch of one school:

> The present building was built forty-two years ago. It may be interesting for you to know that General Morgan with his troops of Southern soldiers passed under the Arch Culvert, which is about one mile east of the school building. The late Charlotte Rannells related how she drove her horses into the woods back of the school building to keep the Southern troops from exchanging worn-out horses for better or fresh ones.
>
> It is also rumored that an underground station for runaway slaves was located on the farm now owned by Elmer Sims. Several Indian mounds and a half-moon spring made by the Indians are to be found in the district. The wild-cat den on the Elliott farm is of interest especially to hunters.

A representative body of the Elementary Principals of the State of Ohio met in Music Hall, Cincinnati, Tuesday, February 24, 1925, for the purpose of organizing and electing officers for a permanent state organization of elementary principals to be known as the State Elementary Principals Association. This meeting followed a lecture by Miss Jessie M. Fink, of Grand Rapids, Michigan, National President of the Department of Elementary Principals, who gave the movement her very hearty endorsement. At the Fifth Annual Ohio State Educational Conference, the elementary principals held another meeting to complete the organization.

The following were elected officers: Mr. C. H. Porter, principal of the Washington School, Cincinnati, and president of the Cincinnati Principals' Club, was elected president of the organization;

Mr. F. H. Duffy, principal of Roosevelt School, Steubenville, and vice-president of the Eastern Ohio Teachers' Association, was elected secretary; Katherine Mansfield, principal, Cedar School, Canton, was elected treasurer.

On February 12, 1925, the Cuyahoga County Board of Education consolidated Richmond Heights, the west half of Highland Heights and the north one-third of Beechwood with the new South Euclid-Lyndhurst Village School District for school purposes. This consolidates what was formerly five school districts into two, namely, *Mayfield* and *South Euclid-Lyndhurst*. These large school districts will now be able to organize complete school systems with good first-grade high schools. The South Euclid-Lyndhurst District will have a valuation of nearly $25,000,000 and Mayfield a little over $21,000,000.

This practically completes the re-districting program of the County Board of Education in the North-Eastern part of the County. The County Board is now planning similar action in the Southern part of the County.

Educational Readings

THORNDIKE, EDWARD L. *The Improvement of Mental Measurements*, *JER*, 11:1–11, January, 1925.

Although existing instruments for measuring intellect are much better than those formerly available, they are still characterized by two serious defects: "first, the units of measure are arbitrary; . . . . second, we do not know how much of intellect these scores measure and how much they are contaminated by factors outside intellect." The suggestion is offered that a large improvement in mental measurements would be effected if we could obtain measures of *level of intelligence*, *range* at each level, *speed*, and *method* and combine the four with proper weights so as to form a rating of an individual.

CHARTERS, JESSIE ALLEN. *How Two Hundred and Fifty-Eight Junior College Women Study*, *JER*, 11:41–48, January, 1925.

A job analysis of study procedures revealed a great variety of practices. The steps most frequently employed in the preparation of an assignment were: (1) by reading once or twice, (2) by outlining, (3) by making marginal notes, and (4) by mental review or recitation.

McCALL, W. A. *Scientific Measurement and Related Studies in Chinese Education*, *JER*, 11:85–94 and 177–89, February and March, 1925.

This is an interesting and instructive account of the writer's experiences as Director of Psychological Research for the Chinese National Association for the Advancement of Education. The article describes the tests which were constructed and the projects which were undertaken. The account is liberally besprinkled with delightful anecdotes relative to Chinese life and Chinese educational practices. A list of tests constructed and projects undertaken by the Chinese National Association for the Advancement of Education is appended to the article.

GREENE, HARRY A. *Directed Drill in the Comprehension of Verbal Problems in Arithmetic*, *JER*, 11:33–40, January, 1925.

Following Dewey's lead, the writer sets up five steps in problem solving: *comprehension*, *analysis and organization*, *recognition*, *solution*, and *verification*. Directed drill on the selection of the processes necessary to solve a problem resulted in a gain in the Monroe Reasoning Test of 4.49 points for the drill group as contrasted with a gain of 2.74 points for the control group.

GOODIER, FLOYD T. *Reduction of Over-Ageness*, *JER*, 11:25–32, January, 1925.

Over-ageness at Chicago Heights was reduced from 36 percent in 1918 to 28 percent in 1923. This was accomplished through calling the teachers' attention to retardation, improving the supervisory force, introducing departmental work in grades VII and VIII, establishing a summer session, receiving fewer aliens as a result of the Immigration Law of 1921, giving attention to physical needs, and establishing special rooms.

SAGE, EVAN T. *Who Should Study Latin?* *CJ*, 20:143-51, December, 1924.

The writer reaches the conclusion that as students come to our secondary schools at the

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NOTE.—The abbreviations used in this number are: *JER*, Journal of Educational Research; *CJ*, Classical Journal; *MT*, Mathematics Teacher; *EA&S*, Educational Administration and Supervision; *JEP*, Journal of Educational Psychology; *S&S*, School and Society.

present time they may be grouped into three classes: (1) those who should study Latin taught in the traditional fashion; (2) those who should study a modified Latin; and (3) those who should not study Latin at all. The writer believes that the first group, made up mainly of gifted children, will be rather easily selected; that the best method of identifying the second group is the ordinary intelligence test; and that it is recognized that a language aptitude test is needed, but that those at present worked out are ineffective. A group of problems is suggested which the joint resources of Latin and psychology departments should be able to solve.

Price, Lillis. *Changes in Subject-Matter and Method to Fit Different Ability Groups in Mathematics*, MT, 17:495-99, December, 1924.

The discussion is limited to the work of the first two years, and deals only with the below-average and above-average groups. The first problem is the adaptation of subject-matter and methods in terms of the outstanding difficulties and abilities of the individual groups. The second problem is that of keeping each individual working. The conclusion is that instruction given to a group of carefully selected slow pupils is much more effective and produces much better results than the same amount of time spent in instruction in mixed classes upon the same group of individuals. The writer questions the value of a special grouping for accelerated students. Her belief is shown in "slow but sure" and "come easy, go easy," the findings of educational psychology to the contrary notwithstanding.

Committee on the Curriculum. *Junior High School Curricula*, EA&S, 10:574-604, December, 1924.

Thirty pages of this number of the journal are concerned with an extensive report of a committee on the curriculum prepared by members of a course in Junior High-School Organization and Administration at Teachers College, Columbia University, in the summer of 1924. Standards are set up, programs of study outlined for each year in large and small schools, some information given concerning the course in each subject, and a bibliography of recent material. The report should be of genuine assistance to school administrators who are seriously considering the curricular problem, in their junior high-school organization.

Whitely, Paul L. *The Dependence of Learning and Recall upon Prior Mental and Physical Conditions*, JEP, 7:420-28, December, 1924.

The problem consists of three parts: (1) the effect upon learning of mental and physical activities introduced immediately preceding learning; (2) the effect upon subsequent recall of mental and physical activities introduced immediately preceding learning; and (3) the effect upon recall of mental and physical activities introduced immediately preceding recall. The results, based upon a very few cases, are largely negative in character. They indicate that such amounts of physical or mental work as were used in the experiment do not influence either the ability to learn such material as was used nor the ability to recall such material twenty-four hours later.

Hunter, George W. *Is There a Sequence in Secondary-School Science?* S&S, 20:762-66, December 13, 1924.

By a comparison of results obtained from two questionnaires, one in 1908 and the other in 1924, the author shows the tendency in science courses offered in secondary schools. Physiography in the ninth year has rapidly decreased; botany and zoology, as such, have practically disappeared; physics and chemistry have gained slightly; and general science has appeared as a new subject in the ninth grade. Two tables give detailed figures regarding courses for each subject offered in the different years. The tendency during the last sixteen years and the outlook for the future are pointed out.

Emerson, D. A. *The Distribution of Marks in High Schools of Varying Size*, S&S, 21:54-56, January 10, 1925.

The marks of 41,398 pupils given as final semester grades for the school year 1922-23 in thirty high schools of the States of Washington and Idaho show on the whole a very evenly balanced distribution. In the smaller schools a larger percent of high marks and a smaller percent of low marks were given. With reference to subjects, high marks were given most frequently in music, biology, domestic science, physical education and shorthand, while the low marks were most frequent in penmanship, civics, and chemistry. Girls received more high marks than boys and also were marked low less frequently.

Reeve, W. D. *The General Trend of Mathematics Education in Secondary Schools*, MT, 17:449-58, December, 1924.

The writer calls attention to the rapid growth of the high school in numbers, and to the attempts at homogeneous grouping which are being made. Since the increase in numbers probably means a larger proportional increase in the number of those having relatively low intelligence, he raises two questions: (1) "The wisdom of requiring a year of algebra of all pupils, to say nothing of a year of geometry," and (2) "The best way of dealing with the differences in ability among the pupils who are able to take the course." He shows that a proper reorganization of subject-matter and method is a definite task and asserts that teachers in mathematics must give more

serious study to the present types of teaching material. He suggests that teachers in other fields are not competent judges of the use which might be made of mathematics in their own field, and thinks that mathematics teachers will probably have to show them. The article is not based upon research, as usually considered, but shows evidence of clear thinking in terms of modern educational demands.

BOOKS TO READ

BARBER, H. C. *Teaching Junior High-School Mathematics.* Boston, Houghton Mifflin Company, 1924. 136 pp.

This is the first of a series of mathematical monographs which are to be prepared under the editorial direction of Professor J. H. Young. The author tells what the new program in mathematics is and why it should replace the older program, and makes many suggestions regarding the methods of teaching the newer materials. His descriptions of the place of algebra and geometry in the seventh and eighth grades, the new algebra in the ninth grade, and approximate computation, excellently interprets the spirit and intent of junior high-school mathematics.

GLASS, JAMES M. *Curriculum Practices in the Junior High School for Grades V and VI.* Chicago, University of Chicago, 1924. 181 pp. (Supplementary Educational Monographs, No. 25).

Although the conclusions presented by this author are rather general, still the report will be useful to administrators and persons interested in the organization of courses of study for the junior high school. This monograph contains an excellent account of the present status of the curriculum in the intermediate and junior high-school grades. The data are summarized in such a way as to be easily useful to students of education who are not particularly interested in statistics.

STRAYER, G. D., director. *Report of the Survey of Certain Aspects of the Public-School System of Providence, Rhode Island.* Providence, R. I., Board of Education, 1924. 222 pp.

The survey of the Providence school system presents the usual topics of organization and administration of schools, the present school plant, the growth of the city, school financing, and school costs. The Survey Commission concludes that although Providence is a very wealthy city, the tax rates are low and expenditure for public schools is much lower than that in other cities of comparable size. The Commission believes that it will easily be possible for the city to increase its support of education to such a point that its school system will be thoroughly first class in every particular; and yet keep the burden of taxation much lower than that in other American cities of the same size.

An interesting innovation which appears in this survey is the use of a technique for estimating population growth. By use of this scheme the estimated population from 1850 to 1915 agrees reasonably well with actual census figures.

KOOS, L. V. *The High-School Principal.* Boston, Houghton Mifflin Company, 1924. 121 pp. (Riverside Educational Monographs).

This book contains a summary of the information gathered from more than four hundred principals in towns ranging in population from one thousand to one hundred thousand. The material is gained from the answers to specific questions regarding sex distribution of principals, typical salaries and salary advancement, the training of the present incumbents, the type of educational work, the time allowance for administrative and supervisory activities, and the amount of initiative allowed principals.

IN PAPER COVERS

WATKINS, ISABEL. *The County Unit of School Administration.* Columbia, University of South Carolina, 1924. 165 pp.

This pamphlet contains an outline and collation of material prepared for the use of the South Carolina High-School Debating League, on the subject of the county unit of school administration. Persons interested in this topic will find the material here assembled of considerable value.

STODDARD, JAMES ALEXANDER. *Backgrounds of Secondary Education in South Carolina.* Columbia, University of South Carolina, 1924. 112 pp.

This study of secondary education in South Carolina is given in terms of the aims and purposes indicated by the social background rather than a historical account of the development of this type of education. The discussion falls under three general headings: colonial backgrounds, post-Revolutionary backgrounds, and post-Confederate War backgrounds. Although secondary education in South Carolina has had slow growth, the author concludes that a high-school education is now commonly held as the minimum standard of preparation which a community should provide for its future citizens.

Special New School-Buildings Number. Harrisburg, Pennsylvania, Pennsylvania State Education Association, December, 1924. 200 pp.

The December issue of the *Pennsylvania School Journal* is a special new school-buildings number. The first 39 pages contain short articles by various members of the State Department of Public Instruction, and here Superintendent Becht outlines Pennsylvania's educational program in sixteen items. The remaining pages contain photographs of the school buildings throughout the state.

The citizens of Pennsylvania may well be proud of many of the buildings the photographs of which are displayed in this collection.

North Carolina State Department of Public Instruction. *Survey of the Public Schools of Lenoir County.* Raleigh, North Carolina, State Department of Public Instruction, 1924. 233 pp. (Educational Publication, No. 73. Division of Supervision, No. 17)

A report of this survey is discussed in two sections: Part I, "The Present Educational Situation in Lenoir County;" Part II, "Proposed Plan for Reorganization and Support." Under the present educational situation are discussed the population and taxable wealth, the present system of education, the course of study, school attendance, preparation of the teachers, and the results obtained from the instruction. In light of the findings of this report the following principles are advocated: (1) that the support of public education should rest on a uniform county-wide tax for a minimum school term of at least eight months for all the children of the county; (2) that all school buildings should be constructed out of funds furnished by the county as a unit; and (3) that the scheme of reorganization should be on a county-wide basis and should furnish standard educational opportunity to all children in the county.

Detroit Public Schools. *Course of Study in Arithmetic, Grades II to VIII of the Elementary School.* Detroit, Michigan, Board of Education, 1924. 142 pp.

This course of study has been prepared under the direction of Mr. Thiele, supervisor of exact science in the Detroit school system, assisted by a number of teachers employed by the system. It consists of two parts. The first presents the course of study for Sections A and B, of grades II-B to VIII-B inclusive. The material is presented under three heads: suggested activities, content and general applications, and arithmetical idea or principle and form. In Part II, the course for VII-A, VIII-B, and VIII-A are presented under three main heads: suggested activities, content, and information. The supplementary surveys and the studies given in Part II were prepared by contributing teachers. These include: a grocery store for the second grade, the use of fractions in everyday life, practical uses of percentage, survey of installment plans, taxation survey, stock and bond survey, and use of bank forms.

Detroit Public Schools. *Arithmetic Teaching and Checking Devices, Grades III to VIII.* Detroit, Michigan, Board of Education, 1924. 67 pp.

With the approvement of methods of checking the products of teaching, the realization that many pupils are experiencing difficulties due to half learning is being emphasized. In this pamphlet are presented a series of devices and exercises which have been gathered for the purpose of helping pupils to check and master their work. Exercises are also included which will assist in the development of the power to analyze applied problems. Certain sets of abstract and concrete review tests are also included.

Association for Peace Education. *Analysis of the Emphasis upon War in the Elementary-School Histories.* Chicago, Illinois, 5733 Blackstone Avenue, Association for Peace Education, 1923. 23 pp.

Based upon a quantitative analysis of the elementary-school history textbooks and supplementary readers of a historical nature, this report concludes: (1) The average history text devotes a disproportionate amount of space to war. The war space could be reduced at least one-half without detracting from the historical value of books. (2) The amount of space devoted to peace is almost negligible. (3) There are practically no illustrations of distinctly peace topics. (4) The war word content is on the whole nationalistic, biased, and in many cases, flamboyant. (5) Very few histories even approach the real truth about war. (6) Histories pay little attention to the Edisons, the Horace Manns, and the Franklins; they are too busy depicting the overdrawn exploits of the Lees, the Grants, and the Nathan Hales. (7) Much of the supplementary reading material of an historical nature is neither history nor literature; it is untrue sentimentalism.

Ohio University est une école jeune et en plein progrès, placée sous l'habile direction du Doyen Arps. Le personnel y est particulièrement enthousiaste et compte parmi ses membres des hommes de grande valeur, tels le Dr Buckingham, le vaillant directeur du *Journal of Educational Research* et le créateur, en 1918, a l'Université d'Illinois et, depuis l'organi-

sateur infatigable des bureaux de recherches pédagogiques; tels encore les Prof. Drs. S. et L. Pressey, spécialistes de la méthode des tests, qui nous ont si aimablement montré leur superbe collection de tests, la plus riche des Etats-Unis peut-être; ils viennent de publier un petit volume d'introduction à l'emploi des tests standardisés qui constitute une excellente mise au point de la question présentée sous une forme aussi claire que précise. C'est un véritiable modèle de l'ouvrage d'initiation qui rendra les plus grands services aux débutants et surtout aux maîtres, en raison du souci constant que les auteurs one pris, d'étayer leur exposé sur des exemples simples et bien choisis dans la pratique scolaire elle-même.

Le Prof. Bode qui enseigne la théorie de l'éducation est de l'ecole des pédagogues à culture avant tout philosophique, c'est donc un esprit surtout préoccupé du point de vue qualitatif, mais qui a su prendre une attitude de critique sympathique en face du mouvement intensif de pédagogie quantitative.

—Dr O. Decroly and R. Buyse, *La Pédagogia Universitaire aux Etats-Unis.*

NEW TESTS

The Detroit Word Recognition Test, devised by Eliza F. Oglesby, is published by the World Book Company. It is especially prepared to measure the reading ability of pupils who have had only a few weeks of instruction in reading, but it may also be used in the second grade. Norms for the first three grades are furnished.

The new scale Tests on Ohio, which is intended to measure the history, geography, industry, and commerce of the State, has recently been published by Ginn and Company. The test is divided into three parts. The first part contains 50 questions; the second part, 50; and the third part, 30. The test is so devised that it may be objectively scored.

A NEW SUMMER-SCHOOL COURSE

A new course entitled "The Place of the School in the Social Organization" will be given during the first and second terms of the Summer Quarter. Dean Arps says: "This course has for its main objective the development of social vision in prospective school administrators, and the public school is the most effective formal educational agency in the realization of the ideals of a democracy."

Five lectures each week will be given and conferences will be arranged. Two hours of credit will be given for the work, and the course may be elected either term separately (380—First Term; 381—Second Term). Six well-known men in the field of school administration have been obtained to conduct the course, each man lecturing for one week.

Lecturers	Topics
June 22–July 3	
C. R. REED, *Superintendent, Akron, Ohio*	The Social and Educational Philosophy of the Superintendent
July 6–10	
A. E. MORGAN, *President, Antioch College, Yellow Springs, Ohio*	An Educational Program and Its Social Bearings
July 13–17	
PAYSON SMITH, *Commissioner of Education, Massachusetts*	A State Program of Education in Its Social Aspects
July 20–31	
C. S. MEEK, *Superintendent, Toledo, Ohio*	An Educational Program for the Community
August 3–14	
E. D. ROBERTS, *Acting Superintendent, Cincinnati, Ohio*	A City Program of Education in Its Social Aspects
August 17–28	
R. G. JONES, *Superintendent, Cleveland, Ohio*	The Superintendent as a Leader in Relation to the Teaching Staff and to the Community
August 31–September 3	
WM. O. THOMPSON, *President, Ohio State University, Columbus*	Concluding and Summarizing Lectures